



U.S. Department
of Transportation
**Federal Highway
Administration**

ITS

at a glance

Produced By The Department Of Transportation's Intelligent Transportation Systems, Joint Program Office
Covering Metro Travel Management, Commercial Vehicle Operation (CVO), Rural ITS Infrastructure, Intelligent Vehicle Initiative, and other supporting ITS activities and issues.

U.S. DOT Launches Intelligent Vehicle Initiative Will Reduce Crashes, Fatalities, Injuries—and Deliver Many Other Benefits

The U.S. Department of Transportation (US DOT) has launched the Intelligent Vehicle Initiative (IVI). This new program will accelerate development and deployment of high technology products that will help drivers reduce vehicle crashes.

These technologies will provide motorists with the capability to avoid collisions, as well as travel information and driving assistance. The collaborative effort, guided by a public-private sector working group, will be carried out jointly with the motor vehicle industries, state/local governments, and other stakeholders.

US DOT's Vision and Role

The vision is for a roadway network where Americans can travel much more safely and enjoy greater mobility through the widespread use of Intelligent Transportation Systems (ITS). In carrying out its mission through the IVI program, the

Department will provide leadership, expertise, resources, and information in a continuing effort to improve the quality of the nation's roads and vehicles.

The Problem

Our mobility costs too much in vehicle crashes. Accidents kill or seriously injure far too many people and result in enormous personal and economic loss for victims, their families, their insurers, and taxpayers. Secretary of Transportation Rodney E. Slater recently noted that "...we lose 42,000 people a year in highway crashes, a tragically high number. This is a public health problem that we must keep pounding at every day and in every way."

The National Highway Traffic Safety Administration (NHTSA) estimates that the financial burden of these crashes

Initiative, continued on page 2

ITS Model Deployment Initiative—An Update

Model Deployments Advance Toward Full Operation

Launching the Initiative

In October 1996, the Secretary of Transportation selected four metropolitan areas to serve as model deployments or show-cases for a fully integrated, multimodal Intelligent Transportation Infrastructure (ITI). In choosing the four from among 23 applicants, the US Department of Transportation (US DOT) emphasized integrated transportation management systems and regional traveler information services.

A total of \$38.7 million in federal grants was awarded to public/private partnerships in the New York/New Jersey/Connecticut metropolitan area; Phoenix, AZ; San Antonio, TX; and Seattle, WA. Non-federal partners provided 50% or more of total project costs in each area.

Recent Activities: Workshops

Since the Secretary's announcement, four workshops have been held to promote coordination and information exchange among the four sites. Discussions among US DOT staff and pub-

lic/private sector participants have focused on developing common interfaces and standards for ITS components, the national strategy for evaluating the model deployment projects, and the sharing of experiences and lessons learned.

To promote standardization and commonality among sites, the National ITS Architecture team has identified six priority interfaces where common specifications might be possible. The

Deployments, continued on page 2

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In This Issue

- ▶ Intelligent Vehicle Initiative.....pg. 1
- ▶ Model Deployments.....pg. 1
- ▶ ITS Standards Programpg. 3
- ▶ ITS Improving Transit.....pg. 4

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exceeds \$150 billion per year. If this costly toll is to be reduced and significant improvements made in the safety of our transportation system, the number and severity of vehicle collisions must be cut.

About 90 percent of all highway crashes are due to driver errors. Most accidents are caused by inattentive, reckless, or impaired drivers.

Some Solutions: ITS Crash Avoidance Systems

Preliminary estimates by NHTSA show that three ITS crash avoidance systems—rear-end, lane change, and roadway departure—have the potential, when combined, to reduce vehicle crashes by about 17% or 1.2 million accidents annually. The three can warn drivers, recommend response actions, and introduce automated control of the vehicle, on a temporary or partial basis, in hazardous situations.

IVI Goals

IVI's primary goal is to improve the safety of the transportation system by reducing vehicle crashes, fatalities, and injuries.

The IVI will also deliver other benefits. The new program will increase:

- **Mobility**—by improving access to activities, goods, and services
- **Efficiency**—by decreasing travel times and improving the use of the existing highway system
- **Productivity**—by reducing operating costs and improving the economic efficiency of the highway system
- **Environmental Quality**—by reducing fuel consumption and vehicle emissions

IVI goals will be achieved by increasing the number of smart vehicles and smart roads in the country—roads equipped with

ITS infrastructure that will provide drivers with up-to-the-minute, on-board travel information about how the transportation system is operating (e.g., advice on accidents, congestion, construction, weather)

An intelligent transportation system is one in which everything is smarter—users, vehicles, and network infrastructure.

Program Funding

The Administration's NEXTEA proposal requests a minimum of \$25 million annually to fund the Intelligent Vehicle program, with total funding likely to be at or near the fiscal year 1998 budget request of \$50 million. Cooperative agreements with industry will also be used, requiring cost matches of 20-50%.

The Challenges

Perhaps the biggest challenge for the Intelligent Vehicle program is to design technologies that fit the behavior, perception, and cognition of all drivers. Automotive technology has never tried to do what a driver does in assessing the immediate need for speed and path control—has never tried to complement human visual performance and the higher cognitive faculties used in judging risks and adapting.

Research Outcome

IVI research aims for two primary outcomes: (1) vehicle manufacturers and their suppliers offering IVI systems as part of their standard product line in production vehicles and (2) State, regional, and local governments installing infrastructure-based IVI system components on their highway systems.

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workshops discussed recommendations on fostering compatibility for each interface.

A draft National Evaluation Strategy for the deployment projects has been developed and reviewed. Site representatives have been briefed on a proposed benefit-cost analysis.

In June 1997, representatives from the 19 applicant sites not selected as part of the Model Deployment Initiative (MDI) also met to discuss strategies to promote ITS in their areas. Many of these partnerships are proceeding with their model deployment plans without special ITS funding.

Model Deployments

Generally, draft evaluation plans have been completed for most sites. Data collection and public information/outreach activities are also underway.

New York/New Jersey/Connecticut

The initial Transit Itinerary Planning System and basic traveler information system will be operating in January 1998. The entire system will be operating by September 1998.

Over 100 different transportation service providers operate and maintain the region's transportation network. The integrated traveler information system will make travel information

easier to access and more readily available—even customized.

Phoenix AzTech

The full system should be operating in April 1998, in advance of the June 1998 target date. Also,

- ✓ Equipment for the Arterial Smart Corridors project was installed in November.
- ✓ Procurement of automated vehicle location and communication systems for 85 buses began in August.

San Antonio TransGuide

The TransGuide project is also on schedule and will be substantially complete by December 1997. The "traffic tag" probe system that provides real-time traffic data should be fully operational by April 1998. Also,

- ✓ Testing of the Railroad Advance Warning System began in August.
- ✓ Testing of the LifeLink system, which communicates video and vital signs from emergency vehicles to the hospital, is underway.

The LifeLink system will save lives by getting hospital physicians involved earlier in the treatment of accident victims.

Doctors will be able to monitor vital statistics at the scene and en route to the hospital prior to arrival of the ambulance. Fiber hubs are located about every mile along the city's freeways, and commercially available hardware/software allow two-way video teleconferencing between the hospital and ambulances.

Seattle Smart Trek

The Smart Trek project is on schedule and will be substantially complete by December 1997. Operation of the full system will kick off in February 1998. Also,

- ✓ The North Seattle traffic management system began operating in August. Traffic signal systems in 15 jurisdictions have been linked, covering nine cities, two counties, and three transit agencies.
- ✓ Similar traffic signal systems will be operating in Tacoma, as well as South and East Seattle by the end of 1997.

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ITS Standards Program

Development of ITS Standards Accelerates

Standards Promote Deployment of Integrated ITS

The US DOT's Operation TimeSaver initiative introduced a national goal of building an integrated intelligent transportation system (ITS) infrastructure—one where traffic signal controls, freeway management, and transit management systems communicate with each other. While many areas already have such systems in place, too often the technologies are not linked and the components cannot talk and listen to each other. They are failing to deliver their full potential, like stand-alone PCs not connected in a network or to the Internet.

The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 directed the Secretary of Transportation to "... develop and implement standards...to promote widespread use and evaluation of ITS technology...[and] compatibility among ITS technologies implemented throughout the States...."

Standards will play a major role in successfully integrating all nine ITS components, which in addition to the three systems noted above include: electronic payment, incident management, electronic toll collection, railroad grade crossing, emergency response management services, and traveler information. Standards are the mechanisms that define the information and how it is transferred. Standards will ensure that the information can be obtained and understood by all components.

The objective is to make sure that ITS components in different states, cities, and rural areas can communicate and exchange information with each other. This will help reduce congestion, cut operating costs, improve mobility, and—most importantly—save lives.

Objectives of the ITS Standards Development Program

The standards program aims to:

- facilitate "interoperability" at interagency, interjurisdictional, state, and national levels;
- create a competitive environment with multiple vendors for products and services;
- facilitate the widespread deployment of integrated ITS;
- ensure the safety of the public through human factor and operational guideline standards; and

- promote an ITS market with non-proprietary standards that will allow entry of innovative companies and ensure interoperability among all products.

Approach

ITS standards will be developed within the framework of the ITS National Architecture, completed in 1996. The architecture provides a consensus-based plan or structure that will allow acceleration of the standards development process.

A standards survey identified the most critical standards to address first. Top priority over the next three years goes to foundation standards that support the general deployment of ITS; standards that promote national and regional interoperability and ITS metro infrastructure needs (e.g., traffic management, public transit, traveler information); commercial vehicle standards; and safety-related items.

US DOT has chosen not to impose standards from the top down to ensure that standards reflect broad consensus support and benefit from the collected wisdom/multiple disciplines of the ITS industry. Instead the Department is supporting, guiding, and reinforcing the existing consensus efforts by funding the five Standards Development Organizations (SDOs)—e.g., organizations such as the Society of Automotive Engineers. All SDOs working on ITS standards are brought together through the Council of Standards Organizations, a subcommittee of the ITS America Standards and Protocols committee.

Progress—and the Work Ahead—in Developing and Approving Standards

SDOs have formally approved 10 ITS standards. By the end of 1997, about 20 more standards will be ready for formal balloting and possibly available as early guidance for public procurement agencies. Another 40 or so standards are currently being developed in the areas of traffic management, traveler information, transit, commercial vehicle, and safety and human factors. Perhaps as many as 100 ITS standards may be developed to support U.S. deployments.

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ITS Will Make Innovative Public Transportation Even Better

ITS Operational Test Kicks Off on October 1

In the fall of 1997 the Potomac and Rappahannock Transportation Commission (PRTC) launched a new "high tech" dispatching and scheduling system that will improve the "OmniLink" local bus service—an innovative transit service that began in April of 1995. OmniLink serves the public along six "flex-route" corridors with a fleet of 24-passenger, lift-equipped vehicles. The project serves a low-density suburban area in Northern Virginia about 25 miles west of Washington, DC.

Flex-route Transit

The flex-route service, a hybrid of traditional fixed route and demand-responsive paratransit, dispatches vehicles closer to the rider's desired origin and destination. Riders can call to request a bus to pick them up in their neighborhood if bus stops on fixed routes are not convenient.

Flexible routing, within the 1.5 mile-wide corridors enables the service to reach a far larger market and negates the need for parallel paratransit services. Each one-way trip is \$0.75, transfers cost \$.25, and buses operate at 45-minute intervals.

ITS Service Enhancements

OmniLink will benefit from ITS capabilities and unique software developed to automate the flex-route operation. The ITS technologies, known as SaFIRES (Smart Flex-route Integrated Real-time Enhancement System), will further improve operations, making the flex-route service even more cost-effective and customer responsive.

SaFIRES will improve on-street and in-office efficiencies, vehicle tracking, and communication among the integrated ITS components. New capabilities include:

- Electronic tracking of vehicles via satellite—i.e., automated vehicle location (AVL) using global positioning satellites (GPS) and computer-generated mapping
- Computerized scheduling assistance, allowing real-time responses to trip requests=
- Vehicle dispatching software that integrates fixed route, flex-route, and paratransit modes using geographic information system (GIS) mapping
- Electronic digital dispatching of information to drivers through mobile data terminals (MDT) on the buses
- Communication of ridership activity from buses to the office using MDT, which can also provide drivers with routing instructions

Benefits Expected from ITS

PRTC expects these benefits from ITS enhancements:

- **Same day reservations for flex-route service**—The central computer system will require only a two-hour advance notice, rather than the 24-hour advance previously needed.
- **Improved customer communication** with "real time"/one-call reservations

- **Improved fleet tracking**—GPS-vehicle tracking help dispatchers keep vehicles running on time.
- **Increased efficiency and ridership**
- **Automated collection of enhanced operating data**—Extensive electronic data will improve service evaluation and modifications
- **Improved working environment**—ITS will reduce stress and paperwork for customer agents and drivers.
- **Expanded capability to evaluate multiple travel modes**—to meet trip requests
- **Better mobility and quality of life**—Greater access to jobs/schools; reduced vehicle use/emissions—20% of the riders formerly drove alone

Significance

SaFIRES is the first project of its kind in the country. ITS-enhanced OmniLink is a model for suburban, low-density areas wanting to increase the attractiveness of transit and eliminate the need for separate fixed route and paratransit services for disabled individuals, as required by the Americans for Disabilities Act (ADA). The single flex-route service saves PRTC about 50% in operating costs—\$560,000—that would be needed to run both fixed route and paratransit services.

Funding

The ITS Operational Test is funded primarily with an ITS grant from the US DOT, with supplemental funding provided by the state and private team members. The total project budget is \$5.1 million.

A Public/Private Partnership

SaFIRES is a public/private partnership, consisting of federal, state, and local government agencies, along with several private sector firms. The US DOT is the main technical advisor for the development and implementation of the ITS system. The federal agencies also provide an evaluation team to measure program success against national ITS goals.

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ITS at a glance is a quarterly newsletter produced by the U.S. Department of Transportation's Intelligent Transportation Systems (ITS) Joint Program Office (JPO). This quarterly publication highlights and shares major ITS developments within US DOT.

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